

OPTION DESCRIPTION
MODEL

Short description of option (serves as title)

Include DATE of write-up.

Category: (Currently place holder, to be developed)

Resource Area: Specifies the resource area that will receive primary benefit of the option and identifies the TAC generated option number.

Related Options: List of other option numbers that are similar and/or related.

Resources Issue: Description of the problem to be addressed by the option. Identify other resource area related issues, if any.

Discussion: Detailed description of the action option, including any discussion of the option in the TAC action option write-up. The GOAL of the option is also to be included in this section. The GOAL is the expected result and benefit of implementing the option.

List the Council objectives that are partially or fully addressed by the option.

EXAMPLE: *Objectives addressed: Water Quality General, Specific 1 and 2; Water Supply General; Biological Resources Specific 1*

Identify specific related resource issues requiring additional evaluation and review by experts in that area.

Assumptions: List of items taken on faith. No future study would provide definite information.

Format assumptions in conditional tense (would, could) whenever possible.

EXAMPLE: *Increased pumping would be allowed after construction of action option, without additional constraints such as Endangered Species Act.*

Key Feasibility Factors: List of items that require additional study or affect the viability of option.
(Need to identify information necessary for further analysis)

Format Key Feasibility Factors with an active verb at beginning of each statement.

EXAMPLE: *Identify sources of uncontaminated dredge material.*

Implementation Effects:

List of elements for following categories as applicable:

Most Likely Benefits:

Other Possible Benefits:

Most Likely Negative Impacts:

Other Possible Negative Impacts:

Possible Regulatory and Institutional Constraints:

Describe any regulatory or institutional constraints unique to this option.
(Approach for handling more common constraints to be developed)

Other: Description of any related issues affecting viability of option.

References and Published Materials:

Numerical listing of references specifically describing the option or results obtainable and any other known published materials including government bulletins, memo reports, etc. (Compile bibliographic information on all references cited for inclusion in a single master list of references.)

March 1, 1995

Title: Increase Trailered Boat Inspections at California Port Of Entry (POE)

Category: (To be developed)

Resources Area: Aquatic Resources: AR-E-14

Related Options: AR-E-8, AR-E-9, PWR-A-7

Resources Issue:

The introduction of zebra mussels into midwest waterways clogs water conveyance systems to the point where a new separate system must be developed to convey water while the infested system is cleaned. The introduction of this organism into the Sacramento-San Joaquin Delta would cripple the ability to deliver water through export facilities such as the State Water Project. In addition, local diversion systems would be similarly affected. The zebra mussel has no tolerance for salinity conditions and facilities that are in jeopardy are those that occur in the fresher-water areas of the Delta. Conveyance of zebra mussels to California waters could be via boat hulls, through the importation of bait fish from infested areas, or inside ballast tanks from areas where zebra mussels exist.

Related Issue: Biological Impact on Biotic Resources of the Delta; Affect Local government and Agriculture Water Supply Systems that Draw from the Delta.

Discussion:

This action option would develop and implement a border inspection program designed to forestall the introduction of zebra mussels into California. This plan would need to include other western states to act as a buffer to delay its spread westward. The goal would be to prevent the introduction of the zebra mussel into the State and ultimately the Sacramento-San Joaquin Estuary. This option would need to be combined with an aggressive program designed to prevent accidental/intentional introductions by other routes (eg. shellfish, aquaculture, experimental manipulations).

Objectives addressed:

Biological Resources General, Specific 2 and 3; Water Supply General and Specific, Levee and Channel Management General Objective and Specific 2 and 3.

This option would need to be reviewed by experts from all resource areas to evaluate the potential impacts associated with the introduction of this organism into California's water system. Experts would need to periodically review the program to ensure its effectiveness.

Assumptions:

- Introduction of zebra mussels into California would be via commercial and recreational boats from infested waters in the mid-west.
- These organisms would have significant impacts on the Sacramento-San Joaquin Estuaries' water deliver system.
- Introductions will be less likely once people from infected states are aware of their potential to transport and infect other areas.
- Interagency and interstate cooperation in administering this program will occur.
- Zebra mussel infestation into California Waters is inevitable.
- Public cooperation in preventing the introduction of zebra mussels would be accepted.

Key Feasibility Factors:

- Confirm a program to monitor and evaluate the progress of halting the spread of zebra mussels westward could be developed.
- POE inspection station procedures will be developed to detect and restrict entry of zebra mussels via boats and trailers.
- Determine the potential for infestation of the zebra mussel upon the implementing inspection procedures.

Implementation Effects:**Most Likely Benefit:**

- Postponing or preventing the introduction of zebra mussels into the Sacramento-San Joaquin Estuary and State would postpone or prevent damage to water conveyance facilities in the state.

Other Possible Benefits:

- Cooperative agreement with other agencies and states to curb the movement non-native species.

Most Likely Negative Impacts:

None apparent

Other Possible Negative Impacts:

None apparent

Possible Regulatory and Institutional Constraints:

CEQA, NEPA, ESA, CESA, Department of Food and Agriculture (developing and implementing border inspection procedures, Other State Agencies (outside of California)

References and Published Materials:

Zebra mussels: biology, impacts, and control. 1992. edited by Thomas F. Nalepa and Don Schoesser.

March 1, 1995

Title: Restrain Non-native Terrestrial Plant Species

Category: (To be developed)

Resources Area: Aquatic Resources: PWR-A-7

Related Options: AR-E-1, AR-E-2, AR-E-3, AR-E-8, AR-E-9, AR-E-14,
PWR-A-9, PWR-B-2, PWR-C-1, PWR-E-4, PWR-E-6,

Resources Issue:

Within the Sacramento-San Joaquin Delta/Estuary over 100 species of terrestrial plants have been introduced. These introductions (some intentional and non-intentional) have and are still altering the biotic structure of the Estuary. These introduced species compete with native species for habitat, space, and food resources.

Related Issues: Invade Native Species Mitigation Sites; Expand Range of Listed Animal Species that Require Native Vegetation;

Discussion:

This action option would develop and implement a plan to eradicate and control invasive non-native plant species and promote native habitats. In addition, an educational program designed to inform the public and private sector of the detrimental effects associated with intentional and non-intentional introductions. The goal would be to 1) reduce or stop the introduction of non-native species into the Sacramento-San Joaquin Estuary and 2) develop and implement a plan to eradicate non-native plant communities where possible.

Objectives addressed:

Biological Resources General and Specific objectives 1, 2, and 3.

This option would need to be reviewed by the Aquatic and Plant and Wildlife Resources experts to develop a comprehensive plan to define and implement control measures for invasive plant species. In addition, this plan would need to be reviewed by plant experts to keep the program updated and effective.

Assumptions:

- Intentional and accidental release of species into the Estuary is a major route of introduction.
- These organisms (both flora and fauna) have had significant impacts on the Sacramento-San Joaquin Estuaries' ecosystem.
- Introductions will be reduced once individuals are aware of their effect on the Estuaries' resources.
- Public awareness would develop support for additional restrictions/regulations

in preventing additional introductions.

Key Feasibility Factors:

- Confirm that a public cooperation program of preventing the introduction of non-native species would be accepted.
- Determine the benefits from halting non-native introductions can be evaluated.
- Confirm a definition of an "Invasive Plant" can be established and a ranking\priority system developed to deal with these plants.
- Achieve consensus on methods and materials needed to implement non-native plant eradication plan.

Implementation Effects:

Most Likely Benefit:

- Reducing the intentional and non-intentional introduction of non-native species into the Sacramento-San Joaquin Estuary would prevent additional impacts of non-native species on native species.
- Restore native plant and animal communities in the Sacramento-San Joaquin Estuary.
- Significant decrease in the density and diversity of invasive plant species in the Bay/Delta.

Other Possible Benefits:

- Cooperative agreement with other agencies and states to curb the movement non-native species.
- Restoration of native habitats could aid in the rebound of listed and non-listed species.

Most Likely Negative Impacts:

- Public resistance to herbicide use may occur.
- Plan may take a long time to succeed

Other Possible Negative Impacts:

None apparent

Possible Regulatory and Institutional Constraints:

CEQA, NEPA, ESA, CESA, Clean Water Act, and Department of Pesticide

Regulations

References and Published Materials:

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March 1, 1995

Title: Informational Program on Detrimental Effects of Introduced Aquatic Species.

Category: (To be developed)

Resources Area: Aquatic Resources: AR-E-9

Related Options: AR-E-8, AR-E-14, PWR-A-7

Resources Issue:

Within the Sacramento-San Joaquin Delta/Estuary over 150 species of aquatic plants and animals have been introduced. These introductions (some intentional and non-intentional) have and are still altering the biotic structure of the Estuary. These introduced species compete with native species for habitat, food resources, and sometimes even utilize them as prey. Competition between introduced and non-introduced species for habitat, space, and food has aided to the decline of native species in California.

Related Issues: Alter Water Facility Operations; Change in Shipping Operations Prior to entering San Francisco Bay.

Discussion:

This action option would develop and implement an educational program designed to inform the public and private sector of the detrimental effects associated with intentional and non-intentional introductions of species. This program could be modeled after the Department of Fish and Game's Project Wild Program which instructs teachers on how to teach students about the resources and environment. These introductions can occur through the discharge of ballast water in the Estuary, the transportation of plants and wildlife in and on trailered fishing boat, and the release of household pets. The goal would be to reduce or stop the introduction of non-native species into the Sacramento-San Joaquin Estuary.

Objectives addressed:

Biological Resources General, Specific 2 and 3.

Periodic review of this program by biological experts be necessary to keep program updated and effective to changing conditions.

Assumptions:

- Intentional and accidental release of non-native organisms into the Estuary is a major route for the introduction of these species.
- These organisms (both flora and fauna) have had significant impacts on the Estuary's ecosystem.

- Introductions will be reduced once individuals are aware of their effect on the Estuaries' resources.
- Interagency cooperation in administering this program will occur.
- Public awareness would develop support for additional restrictions/regulations in preventing additional introductions.

Key Feasibility Factors:

- Confirm that a public and private cooperation program of preventing the introduction of species would be accepted.
- Confirm public and private awareness would reduce additional introductions.
- Confirm that benefits from the halting of non-native introductions can be monitored and evaluated.

Implementation Effects:

Most Likely Benefit:

- Reduce the intentional and non-intentional introduction of non-native species into the Sacramento-San Joaquin Estuary, preventing additional negative impacts of introduced species on native species.

Other Possible Benefits:

- This program could stop previously introduced non-native species from spreading to other areas of California.
- Cooperative agreement with other agencies to curb non-native species introductions.
- Competition between native and non-native for limited resources within the Estuary would remain at current levels.

Most Likely Negative Impacts:

None apparent

Other Possible Negative Impacts:

None apparent

Possible Regulatory and Institutional Constraints:

None apparent

References and Published Materials:

March 1, 1995

Title: Prohibit Discharge of Ballast Water in Estuary

Category: (To be developed)

Resources Area: Aquatic Resources: AR-E-8

Related Options: AR-E-9, AR-E-14, PWR-A-7

Resources Issue:

Introduction of non-native organisms through ballast water discharge has and continues to cause severe economic damage, such as the shipworm which bores into wood and eats away at it's structure. While others like the Asian clam (*Potamocorbula amurensis*) out competes other organisms for food sources. Introductions of species such as yellowfin goby (*Acanthogobius flavimanus*) and Asian clam were facilitated by ballast water discharge and new non-native introductions continue today. Introductions via ballast water occur when out going ships take in water and organisms (unintentionally) and transport them to another port and discharge the water and organisms into that water system. Since these port areas are similar in water hydrology the organisms survive often without predators and occupy niches of native organisms.

Related Issues: Native Species Declines due to competition and predation; Alter Water Facility Operations; Shipping Operations Prior to entering San Francisco Bay.

Discussion:

This action option would develop and implement regulations and procedures dealing with ballast water discharges outside of the San Francisco Bay\Estuary. The goal would be to reduce or stop the introduction of non-native species in the Estuary resulting from ballast water discharge. This option could be accomplished in a variety or combination of means ranging from: 1) discharging ballast water while outside the Golden Gate; 2) treating ballast water while at sea with a biocide; and 3) ballast water inspections prior to a ship entering the Bay.

Objectives addressed:

Biological Resources General and Specific objectives 1, 2, and 3.

This option would need to be reviewed by Water Quality experts to evaluate the effects of biocide use on water quality and the potential effects of sea water release in the fresher portions of the Estuary.

Assumptions:

- These introduced organisms have significant impacts on the Sacramento-San Joaquin Estuaries' ecosystem.

- Introductions will be reduced once individuals become aware of their potential to transport organisms within their ballast water.
- Interagency cooperation in administering this program will occur.

Key Feasibility Factors:

- Confirm treatment with biocide is effective and not detrimental to native species at point of release.
- Confirm that the release of sea water in freshwater portions is not detrimental to water quality and biological resources.

Implementation Effects:

Most Likely Benefit:

- Reduce the introduction of non-native ballast water organisms into the Sacramento-San Joaquin Estuary, which would reduce competition and predation with and on native species.

Other Possible Benefits:

- Cooperative agreement with other countries and state agencies to curb the movement non-native species.
- Loading of toxins in the Bay may be decreased, depending on the ballast water quality.

Most Likely Negative Impacts:

None apparent

Other Possible Negative Impacts:

None apparent

Possible Regulatory and Institutional Constraints:

CEQA, NEPA, CESA, ESA, Fish and Game Codes, and State and federal legislation to allow for the inspection of ships prior to entering the Estuary.

References and Published Materials: